

ENVIRONMENTAL EDUCATION AND CONSERVATION: A STRATEGY FOR CLIMATE CHANGE AND MITIGATION AMONG UNIVERSITY STUDENTS IN TARABA STATE, NIGERIA

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Abstract

This study assessed the role of Environmental Education as a tool for the creation of awareness on adaptation to climate change in Taraba State, Nigeria. Descriptive survey design was used for the study and the population for the study was 961 out of which 128 students were sampled for the study. Data was collected using questionnaire tagged "Environmental Education, Conservation and Climate-Change Questionnaire (EECCQ)" with a reliability index of 0.73. The three Research questions that guided the study were answered using mean and standard deviations. The findings of this study revealed among others that the undergraduate students have good level of awareness on climate change education, there is a slight mean difference on the level of exposure on Environmental Education and Conservation between male undergraduate students and their female counterparts. It was concluded that awareness, understanding of climate change as well as participation in Environmental Education and conservation campaigns are indispensable strategies to adopt in mitigating the impact of climate change with its attendant consequences. Recommendations were made amongst which include the introduction of Climate Change studies in university programmes.

Key words: Environmental Education (EE), Conservation, Climate change, Mitigation

INTRODUCTION

Environmental Education (EE) is defined by Agbor (2016) as the process that gives individuals opportunities to explore environmental issues, engage in problem solving and take actions to improve the environment. It encompasses the acquisition of knowledge in basic Environmental Education concepts, principles, history, policies, basic human population dynamics, knowledge of biodiversity, sustainable agriculture, forestry, soil conservation, water use, non-renewable mineral resources, non-renewable and renewable energy resources, climate change and ozone depletion, pollution prevention and waste reduction, sustainable cities, environmentally sustainable economic and political systems, environmental ethics and the overall worldviews of environmentalism (Ekpo & Aiyedun, 2018). The concept as submitted by Sijuwade (2015) is a process that promotes the awareness and understanding of the environment, its relationship with man and his activities. EE also aims at developing responsible actions necessary for maintenance, preservation and development of the environment and its components. It allows individuals to explore environmental issues, engage in problem solving, and take actions to improve the environment. As a result, individuals develop a deeper understanding of environmental issues and have the skills to make informed and responsible decisions. Ekpo and Aiyedun (2019) opined that Environmental Education (EE) can be used in primary, secondary and tertiary institutions as well as rural and urban settlements to create awareness on adaptation to climate change in Nigeria. Therefore, EE should result in the knowledge, desires and ability necessary to direct one's conduct for improving the quality of life. It should enable the individual to perceive the problems that exist and to devise solutions to them. It is noted also that EE has a place in the sensitization of the whole environment and the dwellers therein including humans and animals (Ojelade, et. al. 2019). The impact of Environmental education is vital to man when compared to the consequences of ignorance. It enables the individual to recognize and manage climate change

Climate is broadly defined as the long-term statistics or characteristics of weather that are determined over time. These can be any characteristics, ranging from the average expected weather patterns to the measure of the variability and likelihood of extreme events (Colose, 2020). According to the World Meteorological Organization, (WMO, 2021), climate is also the average weather in a given area over a longer period of time. It can be described with information on the average temperature in different seasons, rainfall, and sunshine for a period of over 30 years. Eneji, et.al. (2017) defined climate as the regular weather condition of an area over a prolonged time. Agbebaku (2015) explained the term climate change as the changes in the earth's climatic system. It is majorly concerned with a change due to an increase in the average atmosphere temperature. Changes in climate occur as a result of internal variability within the climate system and of external factors (natural and anthropogenic). The influence of external factors on climate can be compared using the concept of radiative forcing. A positive radiative forcing, such as that produced by increasing concentrations of greenhouse gases and carbon dioxide tends to warm the surface. A negative radiative forcing, which can arise from an increase in some types of aerosols (microscopic airborne particles) tends to cool the surface. Natural factors, such as changes in solar output or explosive volcanic activity, can also cause radiative forcing. Characterization of these climate forcing agents and their changes over time is required to understand past climate changes in the context of natural variations and to project what climate changes could lay ahead.

On the other hand, climate change is any systematic change in the long-term statistics of the components of climate system such as temperature, precipitation, pressure, or wind sustained over several decades or longer (WMO, 2021). Climate change is also a change in the statistical properties of the climate system that persists for several decades or longer, usually at least 30 years. These statistical properties include averages, variability and extremes. The concept may be due to natural processes, such as changes in the Sun's radiation, volcanoes or internal variability in the climate system, or due to human influences such as changes in the composition of the atmosphere or land use.

The United States Environmental Protection Agency (USEPA, 2014) observed a relationship between sustainable development and climate change. The agency maintained that while climate change influences key natural and human living conditions which are the basis for social and economic development, on the other hand society's priorities on sustainable development influence the emission of greenhouse gases that contributes to climate change and vulnerability (Glavic, 2020). Human activities are responsible for almost all of the increase in greenhouse gases in the atmosphere over the past centuries, which are largely caused by the emission of gases from burning fossil fuels for electricity, heat and transportation.

Meanwhile, UNESCO (2017) emphasized that education for sustainable development is crucial for the development of crosscutting sustainability competencies in learners, as well as enable individuals to contribute to sustainable development by promoting societal, economic, and political change and behavioral transformation. Similarly, Glavic (2020) opined that education for sustainable development encourages different disciplines to enter into dialogue, make connections, share knowledge, and work together on emergent areas. The authour added that education for sustainable development aims to develop students' ability to understand and evaluate connections between big issues, such as inequality, public health, global consumption, biodiversity loss and the limits of natural systems. This shows that students should be knowledgeable on issues affecting their environment that could lead to climate change. Maikano et al., (2023) submitted that to mitigate climate change, students need to be knowledgeable in conservation education.

The university is the tertiary level of education. It is regarded as a high-level center for learning. It is therefore expedient that university students, especially the science education undergraduates to access the knowledge of climate change and its relationship to sustainable development. According to Nath (2019), the university undergraduates should acquire the knowledge and understand the concepts and phenomena of climate change. Although climate

change issues are scientific, but it is expedient that all humans should be literate in climate change education for enhancing sustainable development. Agboola and Emmanuel (2016) stated that science literacy is an understanding of human influence on climate and climatic influence on humans and the society at large. The authors identified some qualities of a climate literate person to include: understands the essential principles of earth's climate system; knows how to assess scientifically credible information about climate; communicates about climate and climate change in a meaningful way; and is able to make informed and responsible decisions with regard to actions that may affect climate. They emphasized that the University science education lecturers have a special responsibility of instilling climate change education and general environmental awareness in all the science education undergraduates because Climate change has a cumulative effect on natural resources and the balance of nature. In line with this assertion, Ayanlade and Jegede (2016) submitted that there is the need for the introduction of climate change studies in Nigerian universities. However, the findings of Udu (2020) revealed that most of the undergraduates have good knowledge of climate change education. This study is specifically focused of Taraba state university students' knowledge of climate change.

Ojo and Olaniyi (2020) found out that that the Nigerian environment suffers great abuse by its citizens and is being beset with enormous problems. Considering the impact of climate on human lives in general, Students should be made to understand that humans derive a lot of benefits from the natural world we live in and have the obligation the protect the natural world through conservation of the natural world. Maikano (2022) defined conservation as the controlled exploitation or use of the natural resources such as the soil, plants, animals, water, among others, in order to allow their continuity and also to preserve the original (green nature) of the environment. Conservation education is synonymous to climate change education and it is the process of teaching the learner on how to take good care of their environment in order to maintain its greener nature. This can be achieved through discouraging harmful environmental practices like deforestation, pollution and encouraging good environmental practices like afforestation, recycling of non-biodegradable wastes like polythene bags, plastic, among others.

This research focused on university students in order to access their level of knowledge and understanding on environmental education and conservation in mitigating climate change in Taraba State as the study could entrench into the students the principles of environmental care.

Statement of the Problem

Science education plays a crucial role in addressing climate change in Nigeria by equipping students with the knowledge and skills needed to understand environmental issues and develop sustainable solutions. Despite the importance of climate change education, a significant number of graduates in Nigeria report limited exposure to comprehensive climate change knowledge and curricula, with only about 15.7% receiving in-depth instruction on the subject. It is against this background that the study sought to investigate the Impact of Environmental Education and Conservation in mitigating climate change among University Students in Taraba State.

Purpose of the Study

The main purpose of this study is to investigate the Impact of Environmental Education and Conservation in mitigating climate change among University Students in Taraba State. Specifically, the study seeks to:

- i. Ascertain the level of awareness of University Students on Climate change education in Taraba State
- ii. Determine the level of exposure on Environmental Education and Conservation based on students' gender
- iii. Determine how often University students participate in Environmental Education and conservation campaigns

Research Questions

The following research questions were asked to guide the study:

- i. What is the level of awareness of University Students on Climate change education in Taraba State?
- ii. What is the level of exposure on Environmental Education and Conservation based on students' gender?
- iii. How often do University students participate in Environmental Education and conservation campaigns?

METHODOLOGY

The design of the study was a descriptive survey design to explore on the Impact of Environmental Education and Conservation in mitigating climate change among University Students in Taraba State. The target population for the study comprised of all science education undergraduate in Taraba State university. The population is 961 students and a sample of 128 (61 males and 67 females) students were selected through simple random sampling. The instrument for data collection was a researcher-made structured questionnaire "Environmental Education, Conservation and Climate-Change Questionnaire (EECCQ)" with a four-point Likert rating scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD), weighted as follows; 4, 3, 2, and 1 accordingly for the research questions. The questionnaire comprised of two parts. Part 1 sought information on the bio-data of the respondents, while Part 2 contained three clusters/sections A and B, and C with twenty (30) items on Environmental and Climate change education. The instrument's reliability test coefficient from Cronbach alpha method was at 0.82 which justifies the reliability of EECCQ. This was considered high enough for the study. All copies of the questionnaire were distributed to the respondents by the researcher through class representatives' assistance. The Research questions were answered using the using descriptive statistics of Mean and Standard Deviations. Mean of 2.5 and above was taken as "agreed" while mean below 2.5 was considered as "disagree". The reason for the use of Statistical package for social sciences (SPSS) (Version 22) was because tools such as mean and standard deviation allow for the objective measure of opinion, or subjective data, and provide a basis for comparison.

RESULTS AND DISCUSSION

Research Question one: What is the level of awareness of University Students on Climate change education in Taraba State?

Table 1: Mean and Standard Deviation of level of awareness of University Students on Climate change education

S/N	Items	N	Mean	SD	Decision
1.	I am aware of the causes of climate change	128	2.16	1.53	D
2.	Undergraduates have received education on climate change in my university.	128	3.23	2.42	A
3.	Students are aware that climate change is a serious threat to human existence	128	2.85	1.85	A
4.	Students are familiar with the concept of sustainable development of natural resources	128	2.41	2.22	D
5.	Undergraduates have attended seminars or workshops on climate change	128	1.74	1.09	D
6.	Climate change education should be compulsory in universities	128	3.24	2.45	A
7.	Students are aware of the impact of climate change on biodiversity	128	2.62	1.58	A
8.	Undergraduates have access to resources on climate change education.	128	1.66	1.06	D
9.	Climate change education can influence behavioral change	128	3.18	2.15	A
10.	Students' awareness gives confidence and ability to address climate change issues	128	3.78	2.56	A
Overall Mean and SD of A			3.15	2.17	
Overall Mean and SD of D			1.99	1.50	

Table 1 shows the mean with standard deviation of level of awareness of University Students on Climate change education. The Table shows that the undergraduate students agreed to six (6) of the identified items, but disagreed to four (4). Specifically, they disagreed to item 1,4,5 and 8 which sought information on causes of climate change, concept of sustainable development of natural resources, seminars or workshops on climate change and access to resources on climate change education. Furthermore, the Table shows that the overall mean and standard deviation scores of undergraduate students who agreed to the identified items was 3.15 and 2.17 respectively, while overall mean and standard deviation scores of undergraduate students who disagreed was 1.99 and 1.50. These results show a significant mean difference of 1.16 between the two responses.

Research Question Two: What is the level of exposure on Environmental Education and Conservation based on students' gender?

Table 2: Mean and Standard Deviation of Male and Female Undergraduate Students' Responses on Environmental Education and Conservation

S/N	Items	Gender	N	Mean	SD	Decision
1.	Undergraduate males receive formal level of education on environmental conservation more than the females	Male	61	2.43	1.45	D
		Female	67	2.31	1.67	D
2.	Male students participate more in environmental conservation campaigns than female students	Male	61	2.66	2.13	A
		Female	67	2.51	2.45	A
3.	Male students have taken courses related to environmental conservation more than their female counterparts	Male	61	2.15	2.12	D
		Female	67	1.87	1.08	D
4.	Undergraduate males actively support environmental initiatives on campus compared to their female counterparts	Male	61	2.62	2.23	A
		Female	67	3.36	2.45	A
5.	Male students are more aware of the importance of Biodiversity Conservation	Male	61	3.45	2.78	A
		Female	67	2.65	2.33	A
6.	Female students actively promote environmental awareness	Male	61	2.12	1.23	D

among peers than male students	Female	67	2.22	1.52	D
7. Male students constantly seek out information on environmental conservation compared to the females	Male	61	2.57	2.57	A
	Female	67	2.62	2.71	A
8. Undergraduate males have a sense of responsibility towards environmental conservation compared to their female counterparts	Male	61	2.74	2.54	A
	Female	67	2.62	2.33	A
9. Male students are constantly involved in reforestation efforts in their community than the female students	Male	61	3.46	2.44	A
	Female	67	2.97	2.23	A
10. Male students have participated more in anti-climate change campaigns than female students	Male	61	3.26	2.67	A
	Female	67	3.04	2.19	A
Overall Total	Male	61	2.54	2.20	
	Female	67	2.62	1.80	

Table 2 shows the mean with standard deviation of male and female Undergraduate Students' responses on Environmental Education and Conservation. The Table shows that the undergraduate students agreed to seven (7) of the identified items, but disagreed to three (3). Specifically, they disagreed to items 1, 3 and 6. Furthermore, the Table shows that the overall mean and standard deviation scores of male undergraduates' opinions on level of exposure on Environmental Education and Conservation were 2.54 and 2.20 respectively, while that of their female counterpart were 2.62 and 1.80 respectively. These results show a slight mean difference of 0.08 between the male and female responses.

Research Question Three: How often do University students participate in Environmental Education and conservation campaigns?

Table 3: Mean and Standard Deviation of University students' Frequency of Participation Responses on Environmental Education and Conservation Campaigns

S/N	Items	N	Mean	SD	Decision
1.	Student have participated in environmental conservation campaigns on campus	128	2.68	2.31	A
2.	Student have attended seminars/workshops on environmental Conservation	128	3.52	2.47	A
3.	Undergraduates have joined environmental clubs or organizations on campus	128	2.64	2.13	A
4.	Undergraduates have participated in community-based environmental conservation projects	128	1.85	1.34	D
5.	Student have used social media to raise awareness about environmental conservation issues in the community	128	2.76	2.19	A
6.	Student have worked with local communities to develop environmental conservation projects	128	2.17	1.80	D
7.	Student have participated and developed environmental conservation-related projects or initiatives	128	2.69	2.34	A
8.	Have collaborated with other students or organizations to promote environmental conservation	128	3.74	2.18	A
9.	Students have participated environmental conservation-related policies or guidelines	128	2.78	2.40	A
10.	Students have worked with government agencies or NGOs to promote environmental conservation	128	3.23	2.98	A
Overall Mean and SD of A					2.60
1.75					
Overall Mean and SD of D					1.51
1.07					

Table 3 shows the mean with standard deviation of mean and standard deviation of University students' frequency of participation responses on Environmental Education and Conservation Campaigns. The Table shows that the undergraduate students agreed to eight (8) of the identified items, but disagreed with two (2). Specifically, they disagreed to item 4 and 6 which sought information on community-based environmental conservation projects and Student work with local communities to develop environmental conservation projects. More so, the Table shows that the overall mean and standard deviation scores of undergraduate students who agreed to the identified items was 2.60 and 1.75, while overall mean and standard deviation scores of undergraduate students who disagreed was 1.51 and 1.07 respectively. These results show a significant mean difference of 1.09 between the two responses.

Discussion of Findings

The findings of this study revealed that the undergraduate students of the university involved in the study have good level of awareness on climate change education. The outcome is commendable based on the fact that awareness on climate change is very useful in the impartation of climate literacy through climate change education. This finding agrees with Njoku (2016) who found that the level of awareness of climate change issues among students is high and that students have become knowledgeable of Climate change impact on the society and were eager to acquire more skills and knowledge on climate change and related issues. Njoku stressed further that the impact of climate change is a general phenomenon, and students should be exposed to the dangers of climate change early enough to help them develop positive attitude towards the environment and reduce the dangers associated with climate change. The findings also agree with that of Ayanlade and Jegede (2016) who posits that that students appear far more informed about climate change usually from the Internet and international media.

Secondly, the study shows that there is a slight mean difference on the level of exposure on Environmental Education and Conservation between male undergraduate students and their female counterparts. These findings agree with the findings of Ekpo and Aiyedun (2019) who concluded that both male and female students would be well informed at all levels if exposed to Environmental Education (EE). The findings equally agree with the findings of Udu (2020) whose findings revealed that there is no significant difference in the male and female undergraduates' perceptions on climate change education for enhancing sustainable development. It therefore means that Environmental Education and Conservation skills can be learnt by both male and female students at all categories of learning.

Finally, findings from the study revealed that a majority of participants in the survey have participated and attended seminars/workshops on environmental conservation on climate change and have leveraged on the awareness they received from the platforms they belong such as campus clubs and social media while just a small proportion of them do not. It also shows good number have never being involved in community-based environmental conservation projects. The findings of the study agree with Maikano et al., (2023) who asserted that when students are exposed to outdoor method of instructions, it could mitigate the impact of climate change in the society. This implies that exploring all avenues in order to ensure students are educated and involved in advocating on Environmental Education and Conservation is key for the sustainability of man and the environment as a whole.

CONCLUSION

It is glaring that awareness, understanding of climate change as well as participation in Environmental Education and conservation campaigns are indispensable strategies to adopt in mitigating the impact of climate change with its attendant consequences in Taraba state, Nigeria.

RECOMMENDATION

1. Students in various Universities should be exposed to the importance of Environmental Education yearly or bi-annually on a large scale.

2. Government and relevant stakeholder should provide avenues of advocacies and campaign participation for university students so as to promote Environmental Education and Conservation.

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